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## Adoption and Implementation of Medications in Addiction Treatment Programs

Hannah K. Knudsen, Ph.D.<sup>a</sup>, Amanda J. Abraham, Ph.D.<sup>b,c</sup>, and Paul M. Roman, Ph.D.<sup>b,c</sup>

<sup>a</sup>Department of Behavioral Science and Center on Drug and Alcohol Research, College of Medicine, University of Kentucky, Lexington, KY

<sup>b</sup>Center for Research on Behavioral Health and Human Services Delivery, University of Georgia, Athens, GA

<sup>c</sup>Department of Sociology, University of Georgia, Athens, GA

### Abstract

**Objectives:** Little is known about the extent to which medications are being implemented as routine care in addiction treatment programs. This research describes medication adoption and implementation within the privately funded treatment sector.

**Methods:** Face-to-face interviews were conducted with 345 administrators of a nationally representative sample of privately funded substance treatment organizations in the United States.

**Results:** Rates of adoption of addiction treatment medications in private sector programs were lower than the adoption of psychiatric medications. Even when analyses were restricted to programs with access to physicians, adoption of each addiction treatment medication had occurred in less than 50% of programs. Within adopting programs, implementation was highly variable. While about 70% of patients with co-occurring psychiatric diagnoses received psychiatric medications, rates of implementation of medication-assisted treatment for opioid dependence and alcohol use disorders were just 34.4% and 24.0%, respectively.

**Conclusions:** Although previous research has documented higher rates of medication adoption in privately funded treatment programs, this study revealed that both adoption and implementation of pharmacotherapies to treat addiction remains modest. Future research should examine the different types of barriers to implementation, such as physician decision-making, patient preferences, and system-level barriers stemming from financing and public policy.

### Keywords

medications; implementation research; addiction treatment programs

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Significant resources have been devoted to the development of pharmacotherapies for the treatment of substance abuse disorders.<sup>1</sup> Since 2002, three medications have received approval by the U.S. Food and Drug Administration (FDA): buprenorphine in 2002, acamprosate in 2004, and long-acting depot-naltrexone in 2006. These pharmacotherapies

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Send correspondence and reprint requests to: Hannah K. Knudsen, Ph.D., Department of Behavioral Science, University of Kentucky, 109 Medical Behavioral Science Building, Lexington, KY 40536-0086; Tel: 859-323-3947; Fax: 859-323-5350; Hannah.Knudsen@uky.edu..

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expand the range of treatment options for patients with opioid addiction and alcohol use disorders.

Despite the expansion in the range of treatment options, national data from the specialty addiction treatment system show discouragingly low rates of adoption, meaning any use of these medications within treatment programs.<sup>2-7</sup> Little is known about implementation, or how routinely these medications are used, within adopting treatment facilities. Data on implementation is critical to understanding the scope of medication use among patients for whom these medications may be appropriate.

Using data collected in 2007 from a sample of private-sector addiction treatment programs, this research examines the adoption (i.e., any current use) and implementation (i.e., extent of use among potentially eligible patients) of pharmacotherapies for the treatment of opioid addiction, alcohol use disorders, and co-occurring psychiatric disorders. These descriptive data underline the need for additional implementation research in addiction treatment programs and suggest barriers to the successful implementation of these medications as usual care.

## BACKGROUND

Data from the Substance Abuse and Mental Health Services Administration's (SAMHSA) National Survey of Substance Abuse Treatment Services (NSSATS) showed that, as of March 2007, about 47% of all specialty addiction treatment programs in the US had adopted at least one pharmacotherapy for the treatment of addiction or psychiatric disorders.<sup>8</sup> However, these numbers were driven largely by the proportion of programs (35.4%) that reported current use of psychiatric medications. By contrast, none of the FDA-approved medications for alcohol, opioid, or nicotine dependence had been adopted by more than 17% of the nation's treatment programs.<sup>8</sup>

These data from NSSATS provide only limited insight into differential adoption across facilities and can offer no information about implementation of these medications within adopting treatment programs. For example, NSSATS includes only a handful of potential predictor variables, mostly gross measures of organizational structure (e.g., size, profit status, facility type).<sup>8</sup> NSSATS collects no data on key indicators of programs' ability to prescribe medications, such as access to physicians. Demand-side indicators, such as the diagnostic profile of a program's caseload or clients' ability to pay for medications, are not measured as part of NSSATS. Moreover, by reporting use of medications on a simple yes or no checklist, there is no way to measure implementation, which may lead to inflated inferences about how routinely pharmacotherapies are used.

Several other health services datasets include organizational characteristics that are associated with program-level adoption of pharmacotherapies. This body of research reveals that organizational size, location in a hospital setting, access to prescribing staff, and government ownership are associated with medication adoption.<sup>4, 7, 9-12</sup> In addition, medication adoption is significantly more likely to occur in treatment programs with an ideological orientation supportive of innovation adoption and in programs with greater absorptive capacity within their organizational processes.<sup>2, 5, 6, 11</sup> Patient payer source (e.g., percentage of clients paying with private insurance) and the educational level of counseling staff (e.g., percentage of counselors with a master's degree or higher) have been linked to greater adoption of medications.<sup>2, 4, 5, 13-15</sup> Finally, exposure to innovative treatment techniques, such as program-level participation in clinical research protocols, is associated with medication adoption.<sup>16, 17</sup>

While this literature is informative about organizational adoption, the topic of implementation, or the percentage of potentially eligible patients receiving these medications, has been understudied. One of the few program-level studies to examine implementation found that, as of 2000, less than 14% of alcohol-dependent patients received naltrexone and less than 12% of opioid-dependent patients received this medication.<sup>13</sup> Limited implementation of naltrexone was also documented in a physician survey conducted in 2001.<sup>18</sup> Recent research on buprenorphine has focused on adoption by physicians,<sup>19, 20</sup> differentiated its use for maintenance treatment versus detoxification,<sup>21</sup> and described the total number of patients receiving the medication.<sup>22</sup> However, the percentage of potentially eligible opioid-dependent patients receiving this medication has not been reported. Studies describing the implementation of the range of addiction treatment medications with recent data have not been published.

The question of implementation within addiction treatment organizations is important to address for at least three reasons. First, if the percentage of potentially eligible patients receiving medications within adopting programs is high, it suggests that system-level interventions to help organizations overcome barriers to adoption should be prioritized. Second, if programs adopt medications but use them minimally, a series of service delivery questions should be asked about patterns of access, utilization, physician decision-making, and quality of care. Finally, attention should be paid to whether there are disparities in client access to medications within treatment settings.<sup>23</sup> All of these issues underline the importance of moving beyond adoption studies to research on how greater implementation of pharmacotherapies can be achieved in addiction treatment.

Using a nationally representative sample of private-sector specialty addiction treatment programs, the administrators of which were interviewed in 2007 as part of the National Treatment Center Study (NTCS), this research examines more closely a segment of the treatment system that has relatively higher capacity to adopt pharmacotherapies because of their greater access to physicians.<sup>4</sup> First, programs are differentiated by their employment or contractual relationships with physicians and adoption of medications. Then the percentage of “potentially eligible” clients to whom each of the FDA-approved medications is currently prescribed is measured within adopting programs. Although we have previously reported on medication adoption using NTCS data, this research is our first description of the implementation of the full range of addiction treatment pharmacotherapies and psychiatric medications within adopting treatment programs. While not representative of the entire population shown in NSSATS, these data from the privately-funded treatment sector provide insight into the importance of looking beyond adoption to considering levels of implementation.

## METHODS

### Study Eligibility, Sampling, and Data Collection

Unlike the mailed survey methodology employed in the NSSATS in which respondents are provided a checklist of medications, the National Treatment Center Study (NTCS) collects data on pharmacotherapy usage through lengthy, face-to-face, structured interviews with each sampled program's administrator or clinical director. Participating treatment programs were selected via a two-stage random sampling approach. First, all United States counties were assigned to 1 of 10 strata based on population and then randomly sampled within strata. This process ensured inclusion of a mixture of urban, suburban, and rural areas. In the second stage, using national and state directories, all addiction treatment facilities in the sampled counties were enumerated. Treatment programs were then proportionately sampled across strata, with telephone screening used to establish eligibility for the study. Facilities screened as ineligible were replaced by random selection of alternative treatment programs

from the same stratum. Recruitment continued for an 18-month period, and the 345 programs in the final sample represent a 67% response rate. Participating programs received a US\$100 honorarium.

Treatment programs were defined as “private sector” if they received at least 50% of their annual operating revenues from commercial insurance, patient fees, Medicaid reimbursement, and income sources other than government grants or contracts. Programs were also required to offer alcohol and drug treatment at a level of intensity at least equivalent to American Society of Addiction Medicine Level 1 outpatient services. Facilities offering exclusively detoxification or methadone maintenance were ineligible for this study. Because the focus of the study was on community treatment programs, programs based in correctional facilities or operated by the Veterans Administration were excluded. All research procedures were approved by the University of Georgia's Institutional Review Board.

The NTCS interview approach provides several advantages in terms of data quality. First, interviewers were able to assure that they were interviewing the correct respondent; mail and Internet data collection methods can easily allow for substitute respondents who may not possess correct or complete information. Second, interviewers kept respondents focused on a single medication at a time, and follow-on questions allowed interviewers to check for internal consistency of respondents' answers. The interview method allowed for the assessment of respondents' general level of knowledge about each medication as well as real-time clarification and corrections. Although infrequent, study staff reported that some respondents became confused about some of the pharmacotherapies with similar names – most often, naltrexone, naloxone, and Suboxone® (Reckitt Benckiser, Richmond VA). The interview method identified these confusions and allowed for repetition or restatement of questions as needed.

The interviews reviewed each component of the program's treatment services, including the availability and use of pharmacotherapies. Use of psychiatric medications was discussed in a section on the assessment and treatment of clients with co-occurring psychiatric conditions. Other medications, including buprenorphine, methadone, tablet naltrexone, acamprosate, and disulfiram, were discussed individually and in detail. For example, buprenorphine was addressed only if opioid-dependent clients were treated in the program. Respondents were asked to describe the relationship of the prescribing physician to the program and whether buprenorphine was used for detoxification, maintenance, or pain management.

The focus of this analysis is adoption and implementation of addiction treatment and psychiatric medications. Adoption was indicated by any current use of each medication at the treatment program. After inquiring about whether the program used a medication, the interviewer asked whether any clients were currently being treated with that medication, and if so, the average percentage of potentially eligible clients who received the medication. This measure of implementation indicated the extent to which the medication was used to treat clients within diagnostic categories for whom the medication is appropriate (e.g. acamprosate for patients with alcohol use disorders), not the percentage of all patients within the program. For methadone and buprenorphine, respondents were asked separately about the percentages of opioid-dependent patients receiving these medications for detoxification and for maintenance.

## RESULTS

Table 2 shows descriptive statistics for this sample of private-sector specialty addiction treatment programs in terms of structural, staffing, and client characteristics. Column 1

displays descriptive statistics for the total sample of treatment programs ( $n = 345$ ), while the latter two columns compare programs with access to at least one prescribing physician on staff or on contract ( $n = 266$ ) to programs without access to physicians ( $n = 79$ ). There were significant differences in organizational structure, staffing, and client characteristics between programs with access to physicians and those that lacked access to physicians. Programs with physicians were significantly less likely to operate as for-profit entities and less likely to only offer outpatient treatment services. These programs were more likely to be located within a hospital setting, were larger in size, and had a higher percentage of counselors with a master's degree. The percentage of Medicaid clients and clients paying with private insurance was also higher in programs with physicians. Programs with physicians had lower percentages of clients who were involved with the criminal justice system and fewer alcohol-dependent clients. The percentage of clients with co-occurring addiction and psychiatric conditions, however, was higher in programs with access to physicians.

Table 3 shows adoption and implementation of medications to treat co-occurring psychiatric conditions, opioid dependence, and alcohol use disorders. Column 1 displays the percentage of programs that reported any use of each medication in the total sample, while the second column displays adoption in the subset of programs with access to physicians through either employment or contractual relationships. As seen in the first column, more than half of all programs offered psychiatric medications. Among the opioid treatment medications, buprenorphine for opioid detoxification was the most widely adopted (32.8%). Adoption of methadone was low, which was expected because programs that exclusively offer methadone treatment services were excluded from this sample. Approximately one-third of programs had adopted acamprosate or tablet naltrexone for the treatment of alcohol use disorders. As seen in the second column, rates of medication adoption were higher when the analysis was restricted to programs with access to physicians, with increases on the order of about 5 to 10 percentage points, except for methadone. However, even when the sample was restricted to programs with physicians, rates of adoption of addiction treatment medications remained sub-optimal, with less than half of programs reporting any current use of each of these pharmacotherapies.

The final column of Table 3 presents descriptive statistics on implementation, meaning the percentage of potentially eligible patients receiving the medication with adopting programs. Potentially eligible patients were defined as those who were addicted to the substance targeted by the medication (e.g. opioids, alcohol) or those with a co-occurring psychiatric diagnosis in the case of psychiatric medications.

Implementation was highly variable across the different types of medications. For psychiatric medications, implementation was quite high, with an average of 70.1% of substance abuse patients with co-occurring psychiatric conditions receiving these medications. Implementation of the addiction treatment medications was lower. The highest rate of implementation (60.5%) was buprenorphine when used for detoxifying opioid-dependent patients. Considerably fewer opioid-dependent patients (37.3%) received buprenorphine as a maintenance medication. In the small subset of programs that had adopted methadone, about half of their opioid-dependent patients receiving detoxification services were prescribed methadone and 41.3% patients in treatment received methadone maintenance. Implementation of tablet naltrexone for opioid addiction was much lower, averaging just 10.9% of potentially eligible clients.

Implementation of the medications for alcohol diagnoses was quite low overall. Acamprosate was the most widely used of the alcohol treatment medications, with about 17.5% of potentially eligible clients receiving this pharmacotherapy. On average, about 12%

of clients with alcohol use disorders received tablet naltrexone and about 8% of potentially eligible clients received disulfiram.

Finally, overall rates of implementation of medication-assisted treatment (MAT) were calculated to examine whether the low rates of implementation for each medication simply reflected that potentially eligible patients was divided across the multiple pharmacological treatment options. Implementation of MAT for opioid dependence was calculated by summing the percentages of opioid-dependent clients receiving methadone for maintenance, buprenorphine for maintenance, and tablet naltrexone within the subset of programs that had adopted at least one of these medications. The average rate of implementation of MAT for opioid dependence was 34.4% (SD = 38.4). Overall implementation of MAT for alcohol dependence was calculated by summing the percentages of alcohol-dependent patients receiving disulfiram, tablet-naltrexone, and acamprosate in the subset of programs that had adopted at least one of these pharmacotherapies. The average rate of implementation of MAT for alcohol dependence was 24.0% of potentially eligible patients (SD = 27.5).

## DISCUSSION

These data from privately funded treatment programs represent a snapshot of a segment of the specialty care system that has previously been shown to have higher rates of medication adoption than public-sector programs.<sup>3, 4</sup> While not directly comparable to the NSSATS and not representative of the entire US addiction treatment system, these data revealed three important findings related to the adoption and implementation of medications. First, programs with access to physicians differed from those programs without physician access on a variety of organizational and client characteristics. These differences are suggestive of disparities in access to medications for different types of patients based on where they receive care, since access to physicians has previously been shown to substantially increase the likelihood of adoption.<sup>4,17</sup> Second, the lack of adoption of FDA-approved medications by addiction treatment programs documented in prior studies continues to persist, even in programs with access to physicians. Third, while psychiatric medications are routinely used within adopting programs, the extent to which addiction treatment medications have been implemented is modest.

Consistent with prior studies, this research continued to show the importance of access to physicians in facilitating adoption of pharmacotherapies. Access to physicians via employment or contracts was the norm rather than the exception in this sample of privately funded programs, and rates of pharmacotherapy adoption were indeed higher when the sample was restricted to such programs. However, comparing rates of adoption of addiction treatment medications to psychiatric medications revealed a disparity in adoption even within programs with access to physicians.

The disparity between psychiatric and addiction medications continued when implementation was considered. Within adopting programs, clients with co-occurring psychiatric diagnoses were highly likely to receive medications. Implementation of maintenance medications for opioid addiction and pharmacotherapies for alcohol dependence was much lower than the implementation of psychiatric medications. To some extent, this difference may be reflective of the far larger range of pharmacotherapies that have been FDA-approved for psychiatric conditions than the relatively limited number of medications that are available to treat opioid and alcohol dependent patients.

Additional research is needed on the adoption and implementation of medications in specialty addiction treatment settings. Lack of access to physicians is a clear barrier to adoption. This barrier is likely to be even more salient in publicly funded treatment



programs, which are less likely to have access to physicians. Research is needed to identify the barriers to creating linkages between physicians and treatment programs. Potential barriers may include limited financial resources due to tight budgets, purchasing constraints (e.g. contracts that do not allow for reimbursement of physician services), and shortages of physicians with expertise in addiction treatment.

While lack of access to physicians is a barrier to adoption, it does not explain the low rates of implementation of addiction treatment medications within adopting programs. Key questions that need to be addressed in future research include: What are the barriers that prevent adopters from using addiction treatment medications more frequently? How can those barriers be addressed? Possible barriers may occur at the levels of systems, patients, and physicians. System barriers may include the lack of inclusion of medications on Medicaid formularies<sup>24</sup> and high co-payments when private insurance offers coverage for these medications.<sup>25</sup> Given the recent passage of the federal parity law, it will be important to measure whether this policy change promotes implementation of medication-assisted treatment.

Client characteristics may also be factors in explaining suboptimal rates of implementation. For example, there may be a lack of patient demand for certain medications.<sup>19</sup> Some patients may have clinical contraindications that may reduce the appropriateness of medication-assisted treatment. For example, buprenorphine may be less clinically appropriate for opioid dependent individuals who are also alcohol or benzodiazepine dependent.<sup>26</sup>

Earlier studies have strongly suggested that unsupportive attitudes among counseling staff may be a barrier to implementing medication-assisted treatment.<sup>27-30</sup> Much less attention has been given to physicians working within treatment programs, resulting in a variety of possible topics for future research. More research is needed on the extent to which physicians' perceptions about the clinical effectiveness of these medications influences prescribing decisions.<sup>31, 32</sup> Perceptions about the challenges of patient adherence may also explain some of the variation in medication implementation. Differences in implementation may also reflect the specialty training areas of physicians. For example, it may be that training in addiction medicine is associated with greater implementation of pharmacotherapies for addiction, but that addiction specialists are under-represented relative to general psychiatrists within treatment programs. Comparing physicians' perceptions about psychiatric and addiction treatment medications in terms of clinical effectiveness and patient adherence may yield important information about the implementation process.

There are several limitations in the current study that must be noted. First, the data are limited to privately funded specialty treatment programs and do not include office-based physician practices in primary care or psychiatric specialties. However, recent data about buprenorphine suggest that about one-quarter of addiction physicians who completed the required training have not written any prescriptions for buprenorphine,<sup>19</sup> suggesting that implementation problems may extend to other sectors of care.

Second, the NTCS data are based on the reports of administrators or clinical directors. Responses were not validated with client chart reviews. Given the variability of implementation between psychiatric medications and addiction treatment medications, it seems that substantial over-reporting is unlikely. Nonetheless, a study using chart review data would be of great value, especially in identifying the diagnostic profiles and other characteristics of clients who are and are not prescribed medications.

Third, the private-sector programs in this sample are a relatively small proportion of those represented in NSSATS. Eligibility criteria for the NTCS sample do not directly map onto the organizational characteristics measured in NSSATS, so direct comparisons of these data

to NSSATS is inadvisable. Moreover, these private-sector programs are known to be more likely than their public sector counterparts to have adopted medications for the treatment of addiction and related conditions. Thus, these data on implementation likely represent a “best case” scenario. We make no claims that these data generalize to the universe of specialty treatment programs; indeed, our conclusions are quite the contrary. However, the modest implementation in programs where both physicians and insurance coverage are more widely available does not portend well for implementation in the rest of the treatment system.

In our analysis of adoption, we focused exclusively on the presence of physicians and did not examine the role of non-physician prescribers, such as physician assistants and nurse practitioners. For the adoption of methadone and buprenorphine, an exclusive focus on physicians is appropriate since non-physicians are prohibited from prescribing these medications. However, non-physician prescribers may have a role in the adoption and implementation of less tightly regulated medications, such as naltrexone. Future research on medication implementation should explore the involvement of the full range of medical professionals.

It is important to also note that this descriptive analysis of medication implementation does not address the factors that may be associated with levels of implementation. For example, future research might consider whether implementation varies by the available levels of care within treatment programs. Some addiction treatment facilities exclusively offer outpatient treatment while others provide outpatient and more intensive levels of care, such as inpatient or residential treatment. Programs also vary in the availability of detoxification services. Our prior work on adoption suggests that levels of care are associated with the availability of medications.<sup>3,4</sup> It would be interesting to test whether implementation is also associated with the types of care that treatment organizations offer.

## CONCLUSIONS

Expanding patients' access to pharmacotherapies in addiction treatment programs requires both adoption and implementation. Findings from this study of privately funded addiction treatment organizations suggest that there are still barriers to adoption even in programs with access to physicians. Within adopting programs, there appear to be greater barriers to the implementation of addiction treatment medications than psychiatric medications for clients with co-occurring disorders. Future research is needed to understand the barriers to implementation as well as the system-level changes needed to align purchasing and regulatory structures with the implementation of medications.

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**TABLE 1**

Percentage of U.S. addiction treatment facilities providing pharmacotherapies on March 30, 2007 (Source: NSSATS data<sup>7</sup>)

Pharmacotherapy	Percent of facilities (N= 13,648)
Medications for psychiatric disorders	35.4%
Acamprosate	17.0%
Disulfiram	16.5%
Naltrexone	15.2%
Buprenorphine	14.3%
Methadone	10.7%
Nicotine replacement	15.9%
Any psychiatric and/or addiction medications	47.2%

TABLE 2

## Organizational Characteristics of in Private Sector Specialty Addiction Treatment Facilities

	All programs % (N) or Mean (SD)	Programs with physician(s) % (N) or Mean (SD)	Programs without physician(s) % (N) or Mean (SD)	$\chi^2$ or t-test (two-tailed)
For profit	36.5 (126)	31.6 (84)	53.2 (42)	$\chi^2=12.24$ , df=1, p<.001
Hospital based	29.6 (102)	34.2 (91)	13.9 (11)	$\chi^2=24.63$ , df=1, p<.001
Outpatient only services	53.5 (184)	44.9 (119)	82.3 (65)	$\chi^2=34.17$ , df=1, p<.001
Number of employees	30.3 (47.4)	36.4 (51.7)	9.68 (16.2)	t=4.47, df=331, p<.001
% Master's-level counselors	52.0 (35.7)	56.3 (33.5)	37.6 (39.0)	t=4.18, df=341, p<.001
% Medicaid clients	15.5 (23.8)	18.0 (24.6)	7.2 (19.0)	t=3.52, df=327, p<.01
% Privately insured clients	34.6 (30.6)	37.1 (30.2)	26.1 (30.7)	t=2.94, df=325, p<.01
% Criminal justice-involved clients	47.4 (31.3)	41.4 (29.2)	66.1 (30.5)	t=-6.50, df=327, p<.001
% Unemployed clients	37.2 (29.0)	38.8 (28.2)	32.2 (30.9)	t=1.76, df=325, p=.08
% Alcohol-dependent clients	69.3 (23.2)	66.7 (22.7)	78.2 (22.8)	t=-3.94, df=341, p<.001
% Clients with co-occurring conditions	49.8 (26.4)	53.5 (25.2)	36.8 (26.6)	t=5.07, df=340, p<.001

**TABLE 3**

Adoption and Implementation of Pharmacotherapies in Private Sector Specialty Addiction Treatment Facilities, 2007-2008

	Program-Level Adoption		Implementation	
	Full sample of programs %	% of programs with access to physician(s) %	Number of adopting programs N	% of eligible clients receiving medication in adopting programs Mean (SD)*
Psychiatric medications	54.5	70.7	188	70.1 (28.5)
<u>Opioid treatment medications</u>				
Methadone (detoxification)	8.1	10.5	28	55.4 (43.7)
Methadone (maintenance)	7.8	10.2	27	41.3 (43.9)
Buprenorphine (detoxification)	32.8	42.5	113	60.5 (38.9)
Buprenorphine (maintenance)	20.9	27.1	72	37.3 (33.5)
Tablet naltrexone	22.0	28.6	76	10.9 (21.2)
<u>Alcohol treatment medications</u>				
Disulfiram	23.8	30.8	82	8.1 (15.7)
Tablet naltrexone	32.2	41.7	111	12.4 (16.0)
Acamprosate	32.5	42.1	112	17.5 (17.2)
Injectable naltrexone	15.9	20.7	55	**

\* Valid N varies by row and includes only those programs prescribing each medication.

\*\* Too few clients to calculate meaningful percentages. As of survey date, average program had delivered injectable naltrexone to 8 alcohol-dependent clients since its adoption.